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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/518,216

09/26/2005

Norio Murase

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EXAMINER

HOBAN, MATTHEW E

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

07/27/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/518,216	Applicant(s) MURASE ET AL.	
	Examiner Matthew E. Hoban	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 May 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 9-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-3 and 5-8 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>5/11/09</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3 and 5-8 and rejected under 35 U.S.C. 103(a) as being unpatentable over Selvan in his publication entitled "Synthesis of Tunable, Highly Luminescent QD-

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Glasses through Sol-Gel Processing” in view of Talapin in his publication entitled “Synthesis and surface modification of amino-stabilized CdSe, CdTe and InP nanocrystals”.

Regarding Claim 1: Selvan teaches QD-glasses comprising either CdSe or CdSe @ ZnS quantum dots. These QD comprise TOPO or TOP surface passivation (See Section 2). Selvan notes that such quantum dots undergo rapid quenching when TMOS is added with ammonia as a passivation additive. This problem is solved by the addition of alkylamines in place of ammonia (See Section 3). The final product is a sol-gel glass with homogeneously dispersed QD's at up to .1 vol%. These glasses have a QY of from 5-10% (See Section 4).

Selvan is silent as to the size of his quantum dots, only detailing teachings regarding the synthesis of the glasses and the properties of such glasses.

However, Talapin teaches a method of making CdSe and CdTe quantum dots with a tunable emission wavelength having a QY as high as 65% at room temperature (See Abstract). This method is highlighted at section 2.2.1 and 2.2.2, wherein CdSe and CdTe QD's are made from stock solutions and passivated with TOP and alkylamines, which are the same two passivating agents used by Selvan. These particles are highly combinable in the invention of Selvan in that they use the same complexing agents, are made of the same composition and have high PL yield and good resistance to

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quenching and deactivation. Therefore, one of ordinary skill in the art would be well motivated to use these particles in that Talapin gives greater detail on adjusting the properties of the QD's which Selvan uses in his composition. The size of particles taught by Selvan is from 1.2-2.5 nm. Talapin teaches a concentration up to 0.1 vol% (See Conclusion). This converts to $1.8\text{E-}3$ to $1.0\text{E-}4$ mol/L, based on the amount of particles necessary to make 1cc (.001 L) of particles (assumption: $V = \frac{4}{3}\pi(r^3)$; particles circular). The final product is thus a CdSe or CdTe particle with a TOP/alkylamine surface coating. This surface coating is chemically different from the sol-gel glass in which the particles are disposed. The combination of references would be obvious to one of ordinary skill since both scientists teach CdSe particles and it would have been obvious to use the CdSe or CdTe particles of Talapin in the QD-doped sol-gel glass of Selvan, since Talapin teaches a greater range of properties which can be achieved and with greater stability.

Regarding Claim 2-3: The glass of Selvan in view of Talapin is made by a sol-gel process involving TMOS. TMOS is considered an organoalkoxysilane as it is of organic nature and includes alkoxy groups since it is tetramethoxysilane (See Section 2).

Regarding Claim 5: Selvan clearly states in his conclusion that the particles can be dispersed at a content of up to 0.1 vol% (See Conclusion). Talapin also notes that the size distribution is very narrow, meaning that this is a monodisperse population of QD's. It should be noted that monodispersion is a measure of the dispersity of the particle size

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distribution and not of the dispersity of said particles in a solvent or solid. Both of these attributes have been discussed but a clarification of the claims might be appropriate (See Section 2.2.1)

Regarding Claim 6: The particles of both Selvan and Talapin are CdSe (See Abstracts).

Regarding Claim 7: The instant claim concerns itself with product by process limitations. These limitations are not given weight in an event where the final product is nominally the same. Talapin also uses a stock solution of cadmium to make Cadmium Telluride particles (See Section 2.2.2). These particles are of the same size and have high quantum yield. One of ordinary skill in the art would be motivated to make use of these CdTe particles created by Talapin in the sol-gel glass of Selvan based on the premise that they are each passivated in the same manner and thus they would interact with the matrix in a similar way. The combination would be obvious based on this fact, and one of ordinary skill in the art would find motivation to combine these teachings based on the fact that CdTe particles give rise to a differing range of emission spectrums and are tunable in the same manner. The emission of this semiconductor is from a pale yellow to blood red. Thus one would be motivated to include these particles in order to create varying colors in the final glass. This desire is further substantiated by Selvan in that he shows that varying emission colors can be created by simple alterations in the size of the particles.

Regarding Claim 8: The size of particles taught by Selvan is from 1.2-2.5 nm. Talapin teaches a concentration up to 0.1 vol% (See Conclusion). This converts to $1.8\text{E-}3$ to $1.0\text{E-}4$ mol/L, based on the amount of particles necessary to make 1cc (.001 L) of particles (assumption: $V = \frac{4}{3}\pi(r^3)$; particles circular) (See Section 2.2.1- Talapin).

Allowable Subject Matter

5. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: Claim 4 narrows the claims to specific silane compositions which include silanes having an amino or ethyl moiety. Though these limitations are to the precursors used for the composition, they still impart patentable differentiation over the prior art based on the fact that the use of amino and ethyl precursors alter the interaction between QD's and the interface between the passivating layer and the actual matrix. The use of TMOS does not cause the same interactions because it only includes methyl groups that dissociate to form the matrix. Therefore it has been established how this modification differentiates. As far as other art goes, compositions which do include APS MPS or ethyl trimethylorthosilicate (trimethyl(ethyl)orthosilicate) are only known in situations where this composition is used to make non-linear materials where the

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particles are created in situ or alternatively simply as a surface coating. Therefore, this limitation cannot be anticipated or made obvious over the prior art.

Response to Arguments

7. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection. The rejection is now based on a photoluminescence glass which explicitly states the given properties and includes a passivating layer different from the matrix layer. The new grounds of rejection does not include a heating step which would destroy such a passivating layer. This was a major point made in the applicant's response and also in the Declaration submitted by applicant (which is recognized and entered). The inclusion of this layer different from the matrix layer caused the need for this new grounds of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/
Supervisory Patent Examiner, Art Unit 1793

/mh/